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ABSTRACT

The objectives of this module include: (1) improving general arithmetic skills including whole numbers, fractions, and decimal fractions; (2) learning to compute averages; (3) strengthening knowledge of percent; (4) learning to locate needed information or statistical data; (5) reviewing or learning the use of the Pythagorean Theorem; (6) reinforcing knowledge of the concepts of area and volume; (7) learning to locate points on a coordinate system; and (8) making calculations related to a circle. Several strong recommendations concerning the use of this module are given. These are: (1) for motivational reasons, it should be used during baseball season, and (2) the annual film on the World Series produced by the Coca Cola Company should be shown as an introduction to the module. (MK)

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TOPICAL MODULE FOR USE

IN A

MATHEMATICS LABORATORY SETTING

TOPIC: MATHEMATICS IN BASEBALL

BY

Mary Stitt and Nat Ostrom

A Publication of

**University of Denver
Mathematics Laboratory
Regional Center for
Pre-College Mathematics**

Dr. Ruth I. Hoffman, Director

Materials:

**World Series Film
*Official Rules of Baseball
Tape measure or yard sticks
Large sheet butcher paper
Official baseball
Statistics from newspaper
Baseball card game deck
Markers for card game**

***Included in module**

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the National Science Foundation Grant #GW-7720.*

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SE 030 319

OBJECTIVES: Students will

- improve general arithmetic skills including whole numbers, fractions and decimal fractions.
- learn how to compute an average
- strengthen their knowledge of percent
- learn how to do research in materials provided them in order to locate needed information or statistical data
- either review or learn the use of the Pythagorean Theorem
- reinforce their knowledge of the concept of area and volume
- learn to locate points on a coordinate system
- make calculations relating to a circle: area and circumference

INTRODUCTION:

There are several strong recommendations concerning the utilization of this module, the first being that for motivational reasons it should be used during baseball season, that is early or late in the school year.

Secondly, it is urged that you arrange to obtain a copy of the annual film on the World Series produced by The Coca Cola Company and show it as an introduction to the module. We pre-viewed "World Series, 1972" and found it to be outstanding in every way. We include in the packet information concerning availability of the

the film. Order it well in advance if you want it at a time appropriate to use with this module. Ask for the most recent World Series film available in an attempt to obtain a copy, even if not the most recent games. .

You will, no doubt, need more than the one copy of the Official Baseball Rules which we enclose, since many questions in the module require that resource. Listed in the Bibliography is a source for that pamphlet, but local sporting goods stores often stock them.

The various activities of this module do not have to be done in a particular sequence; you may, therefore, follow your own inclinations or those of your students. For example, the field trip (card 12) may come much earlier. If you or your students have recommendations or suggestions, please forward them to us.

THE BASEBALL MODULE

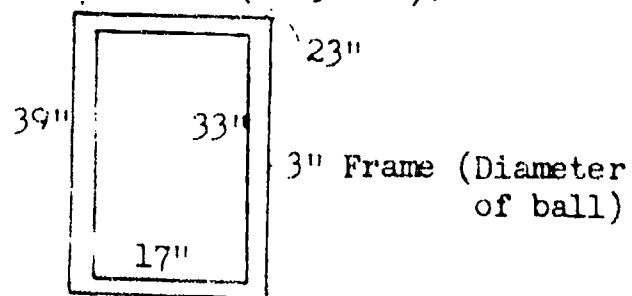
Card 1 - Some students may be interested in verifying the figure in the last paragraph, or in comparing earnings of major vs. minor league players.

Cards 3.0, 3.1 - Official Baseball Rules helpful. Students may want to bring in and post newspaper box scores and other statistics.

Pages 3A, 3B, etc. These pages which are lettered are for duplicating purposes. For example, possibly each student will want a copy of 3A.

Card 5 Here is a discussion of the last question on this card. Since the 33" vertical distance given approximate, it is appropriate to use 3" as the diameter of the ball, rather than 2.95" as computed in the last questions of card 4.

Then, by the definition of strike (section 2.00 page 9, of the 1973 official rules), we must add the diameter of the ball twice to each dimension of the strike zone rectangle which faces the pitcher (see diagram below). The answer is therefore 39" x 23" or 897 in^2 (6.23 ft^2).



Card 7 - The information (sheets 7A -E) furnished by the American and National Leagues are to be used for these exercises.

Card 10 After "Baseball Card Game" (composition of card deck on page 100) students not well acquainted with baseball may need to consult other students. For example, with 2 outs and a man on third, an out does not score the man from third.

LIST OF SOURCES FOR WORLD SERIES FILM*

Mr. F. J. Hendry, Jr.
Coca-Cola USA
5th Floor, Bear Hill Tower Bldg.
60 Hickory Drive
Waltham, Massachusetts 02154

Mr. G. C. Sutcliffe
Coca-Cola USA
300 Marcus Avenue
Suite 3E4
Lake Success, NY 11040

Mr. R. L. Young
Coca-Cola USA
570 Ritchie Highway
Severna Park, Maryland 21146

Mr. J. C. Yeomans
Coca-Cola USA
P. O. Drawer 1734
Atlanta, Georgia 30301

Mr. K. P. Tabb
Coca-Cola USA
F. O. Drawer 3590
Norland Branch
19090 N. E. Fourth Court
Miami, Florida 33169

Mr. T. L. Juza
Coca-Cola USA
1330 Hanna Building
Cleveland, Ohio 44115

Mr. B. G. Johnson
Coca-Cola USA
P. O. Box 7186
Dallas, Texas 75209

Mr. W. C. Ross
Coca-Cola USA
7400 North Oak Park Avenue
Chicago, Illinois 60648

Mr. C. P. Francis
Coca-Cola USA
800 West 47th Street
Suite 404
Kansas City, Missouri 64112

Mr. C. H. Scott
Coca-Cola USA
Rooms 310-312, Marquam Plaza Bldg.
2525 S. W. Third Avenue
Portland, Oregon 97201

Mr. J. B. Martin
Coca-Cola USA
P. O. Box 2366
No. Hollywood, California 91602

* If you have difficulty, contact your
closest Coca-Cola Bottling Company.

Bibliography

Official Baseball Rules
Published each year by the
National Baseball Congress of America
P. O. Box 1420
Wichita, KS 67201
Normally available in sporting
good stores.

Turkin, Hy and S. C. Thompson
The Official Encyclopedia of Baseball, 1970
Barnes Publishing
New York, New York

American League
520 Boylston Street
Boston, Mass. 02116

National League
220 Montgomery Street
San Francisco, CA 94104

Commissioner of Baseball
Professional Baseball Government
680 5th Avenue
New York, NY 10019

Blank Card Source:

Butler Paper Company
601 W. 50th Avenue
Denver, CO 80212

Personalized Instruction Center
NCEBOCS
838 South Lincoln Street
Longmont, CO 80501

ANSWERS

Baseball

Card #1

Baseball has been around -
Year - 1869 =
Ex. 1974 - 1869 = 105 years

Years National League did not have a rival -
1901 - 1869 = 25 years

Average earning
 $\frac{\$37,000.00}{32 \text{ weeks}} = \$1,156.25/\text{week}$

Card #2

Total salary
 $\$1,200 + 1,400 + 1,100 + 1,100 +$
 $(8,000 \times 6) = 9.600$

Comparison:
Modern day players make slightly less
than 4 times the salary of the entire
first pro-team.

Overhand pitching - Year - 1884 =
Ex. 1974 - 1884 = 90 years

Card #3

Percentage of games won
 $\frac{\text{wins}}{\text{Total games}} = \% \text{ of games won}$

Batting averages
 $\frac{\text{hits}}{\text{Official at bats}} = \text{batting average}$

Card # 3 (Cont.d)

Rules

Neither a walk nor sacrifice is an official time
at bat.

The decimal equivalent for a percentage is listed.

No team with a greater team average lost.

Earned run average

An earned run is a run charged against the pitcher,
i.e., not the result of an error.

$\frac{9 \times \text{earned runs}}{\text{innings pitched}} = \text{ERA}$

Low ERA is more desirable.

ERA is a per game statistic therefore the denominator
needs to be divided by nine (or the numerator multi-
plied by nine) to convert from per inning to per
game i.e., $\frac{9 \text{ innings}}{1 \text{ game}}$

Runs you expect a pitcher to give up per game = ERA

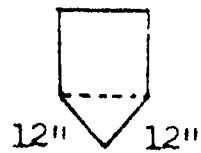
Runs per inning = $\frac{\text{ERA}}{9}$

Games Behind

Use this formula: $\text{G.B.} = \frac{(W - w) + (L - L)}{2}$

G.B. = Games Behind W = Total wins of league leader
w = Total wins of team behind L = losses of team behind
L = losses of league leader

Baseball



Card # 4

$$12^2 + 12^2 = W^2$$

$$W = 16.97$$

A left hander has a shorter distance to run.

$$90^2 + 90^2 = c^2 \quad c = 127.28$$

Diameter of baseball $9 \frac{1}{4}$ inches in circumference is the largest allowable for official play. Diameter is 2.94".

Card #5

The strike zone is a volume bounded by the top of the knees, armpits, front of the plate and back of the plate.

Your strike zone is extended three inches in any direction as a result of the 3" diameter of the ball.

Card # 6

$$\text{Area of infield } A = s^2 \quad A = 6100 \text{ sq. ft.} \\ A = 900 \text{ sq. yds.}$$

$$\text{Area of pitcher's circle } A = r^2 \\ A = 254 \text{ sq. ft.}$$

$$\text{Area of batters box } A = l = w \quad A = 24 \text{ sq. ft.}$$

Card #7

Wrigley Field (Chicago Cubs) does not have lights.

Municipal Stadium (Cleveland Indians) seats 76,997

Jarry Park (Montreal Expos) seats 28,000

$$(402)^2 + (4) = c^2 \quad c = 402.02 \text{ Yankee Stadium}$$

$$(315)^2 + (37)^2 = c^2 \quad c = 317.17 \text{ Fenway Park}$$

Card #8

Maximum attendance - 1,175,128

Average distance to a left field fence in National League = 335.1 American League = 339.1

Card #9

(4,3)	fair	infield
(-9,13)	fair	infield
(9,2)	fair	outfield
(-6,-1)	fair	infield
(7,22)	fair	homerun

All are fair.

(-14,3)	foul	
(14,3)	foul	
(6,26)	fair	homerun
(-6,26)	fair	home run
(2,7)	fair	outfield
(-2,7)	fair	outfield
(4, -8)	foul	

Baseball

Card #9 (Cont.d)

(-4,-8)	foul
(-17,17)	foul
(17,17)	foul

This field is symmetric. That is, holding the ordinate constant and changing the sign of the abscissa causes the ball to land in the same descriptive location on the field.

Card #11A

Difference in circumference of the "core" and the "pill". 1.58"

Difference in diameters - .50"

Difference in radii - .25"

Difference between the circumference of the "pill" and the overall circumference including the second winding of yarn - 4.06"

Difference in diameter between the "pill" and the first winding - 1.16

Differences in radii - .58"

The first winding is the thickest.

The third winding is the thinnest.

$$(13/16 + 5/16 + 3/16) \times \pi = 21/16 \times \pi \cong 4 \frac{1}{8}$$

The first actual professional baseball team was the Cincinnati Red Stockings in 1869. How long has professional baseball been around?

The National League was founded by William A. Hulbert and A. G. Spalding in 1876. In 1901 Byron (Ean) Johnson and Charles A. Comiskey formed the rival American League. For how many years did the National League go without a rival?

If the average earning of a professional, major league baseball player today is \$37,000.00 per season and he plays about 32 weeks, how much does he earn per week during the season?

Here are the annual salaries of the first pro team in 1869: Harry Wright, captain and center fielder, received \$1,200; George Wright, short stop, received \$1,400; Asa Brainard, pitcher, received \$1,100; Fred Waterman, third base, made \$1,100; and the following each received \$800: Doug Allison, catcher; Charles Gould, first base; Charles Sweazy, second base; Andy Leonard, left fielder; Cal McVey, right fielder; and Dick Hurley, substitute. What was the total salary of the team?

How does the total salary of the first pro-team compare with the average annual salary of a modern day player?

Overhand pitching was introduced in 1884. How long has that been?

How is the percentage of games won computed? Use 3C to compute this percentage for any three teams. Compare your percentages with the "Pct." listed.

How are batting averages computed? Use 3D to calculate batting averages for any five players.

Is a walk counted as a time at bat? A sacrifice? (see Official Baseball Rules). Complete 3E. Compare your result with the "Pct." listed. Can you explain the use of the decimal point in the listing?

Did any major league team win the game but have a lower batting average for that game than the losing team, according to page 3B?

What is an earned run against a pitcher? How is an ERA (earned-run-average) calculated? Which would be better for the pitcher, a low ERA or a high ERA? What is the reason for multiplying the number of runs by nine?

Using the information on 3D choose three pitchers and find out how many runs you would expect him to give up per game, then per inning. Complete 3E.

Study the baseball standings given on 3C. See if you can find a method for computing games behind (GB) which works in all cases.

Abbreviations

ab = at bat

r = runs

h = hits

bi = batted in

E = errors

LOB = left on bases

DP = double play

2B = two base hit

3B = three base hit

HR = homerun

SB = stolen bases

SF = sacrifice fly

WP = winning pitcher

T = time

A = attendance

W = wins

L = losses

Pct. = % of games won and lost

GB = games behind

IP = innings pitched

H = hits allowed by pitcher

R = runs allowed by pitcher

ER = earned-runs

BB = base on balls

SO = strike outs

ERA = earned-run average

RBI = runs batted in

American League Box Scores

Twins 9, Sox 6

BOSTON	MINNESOTA
ABERDEEN 4 1 1 1	CARP 2 0 1 1
ABERDEEN 4 0 1 2	DEAN 2 4 3 1
ABERDEEN 3 1 1 0	ALLAHEW 2 3 2 1
ABERDEEN 4 0 1 1	OLIVE 2 4 3 1
ABERDEEN 4 0 1 1	LI 1 0 0 0
ABERDEEN 0 0 0 0	PARSON 2 4 1 2
ABERDEEN 4 1 2 1	MILK 2 1 0 1
ABERDEEN 4 0 1 1	MILL 2 0 1 1
ABERDEEN 4 1 2 0	THOMPSON 2 4 0 1
ABERDEEN 0 0 0 0	REAR 2 4 0 1
ABERDEEN 0 0 0 0	KAL 2 0 0 0
ABERDEEN 0 0 0 0	SANDERS 2 0 0 0
ABERDEEN 0 0 0 0	

Total 34 10 0 Total 22 9 17 9
 Boston 0 0 1 0 0 2 1 0 1 6
 Minnesota 0 0 0 1 0 3 0 0 4
 1P Thompson 2 4 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

IP H R ER BB SO
 1P Thompson 2 4 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

K.C. 5, Brewers 3

KANSAS CITY	MILWAUKEE
ABERDEEN 4 1 2 0	DMAY 2 0 1 1
ABERDEEN 4 1 2 0	MONEY 2 4 1 1
ABERDEEN 4 1 2 0	LATHAM 2 3 0 0
ABERDEEN 4 1 2 0	THOMPSON 2 4 0 1
ABERDEEN 4 1 2 0	FRANK 2 3 0 0
ABERDEEN 4 1 2 0	BROWN 2 3 0 0
ABERDEEN 4 1 2 0	PORTER 2 3 0 0
ABERDEEN 4 1 2 0	COLUMBO 2 3 0 0
ABERDEEN 4 1 2 0	FELKE 2 3 0 0
ABERDEEN 4 1 2 0	VUKOVICH 2 3 0 0
ABERDEEN 4 1 2 0	JOHNSON 2 3 0 0
ABERDEEN 4 1 2 0	GARCIA 2 3 0 0
ABERDEEN 4 1 2 0	SLATON 2 3 0 0
ABERDEEN 4 1 2 0	CHAMPLIN 2 3 0 0
ABERDEEN 4 1 2 0	NEWMAN 2 3 0 0

Total 31 10 4 Total 21 9 4 3
 Kansas City 0 1 3 0 0 0 1 0 6
 Milwaukee 0 0 0 0 2 0 0 1 3
 1P Thompson 2 4 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

IP H R ER BB SO
 1P Thompson 2 4 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

Tigers 5, Texas 1

TEXAS	DETROIT
ABERDEEN 4 0 0 0	MAUTHIO 2 4 0 0
ABERDEEN 4 0 0 0	WINE 2 4 0 0
ABERDEEN 4 0 0 0	NORTHROP 2 4 0 0
ABERDEEN 4 0 0 0	WILSON 2 4 0 0
ABERDEEN 4 0 0 0	STANLEY 2 4 0 0
ABERDEEN 4 0 0 0	SMITH 2 4 0 0
ABERDEEN 4 0 0 0	REAR 2 4 0 0
ABERDEEN 4 0 0 0	CASH 2 4 0 0
ABERDEEN 4 0 0 0	ADAMS 2 4 0 0
ABERDEEN 4 0 0 0	BRIDGES 2 4 0 0
ABERDEEN 4 0 0 0	PERRY 2 4 0 0
ABERDEEN 4 0 0 0	MILLER 2 4 0 0

Total 22 1 1 Total 22 9 4 3
 Texas 0 0 0 0 0 0 0 0 1
 Detroit 0 0 0 0 0 0 0 0 4
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

IP H R ER BB SO
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

Angels 1, Orioles 0

CALIFORNIA	BALTIMORE
ABERDEEN 4 0 0 0	RENNOLD 2 4 0 0
ABERDEEN 4 0 0 0	GRICH 2 4 0 0
ABERDEEN 4 0 0 0	DAVIS 2 4 0 0
ABERDEEN 4 0 0 0	WILLIAMS 2 4 0 0
ABERDEEN 4 0 0 0	BUMBY 2 4 0 0
ABERDEEN 4 0 0 0	BAYLOR 2 4 0 0
ABERDEEN 4 0 0 0	ROBINSON 2 4 0 0
ABERDEEN 4 0 0 0	BLAIR 2 4 0 0
ABERDEEN 4 0 0 0	ETCHEBERRY 2 4 0 0
ABERDEEN 4 0 0 0	RENNOLD 2 4 0 0
ABERDEEN 4 0 0 0	MCCALL 2 4 0 0

Total 21 0 0 Total 20 0 0 0
 California 0 0 0 0 0 0 0 0 1
 Baltimore 0 0 0 0 0 0 0 0 0
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

IP H R ER BB SO
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

A's 11, Indians 4

OAKLAND	CLEVELAND
ABERDEEN 4 1 0 0	RENNOLD 2 4 0 0
ABERDEEN 4 1 0 0	BRONKHORST 2 4 0 0
ABERDEEN 4 1 0 0	CHAMBLISS 2 4 0 0
ABERDEEN 4 1 0 0	LEITCH 2 4 0 0
ABERDEEN 4 1 0 0	GAMBLE 2 4 0 0
ABERDEEN 4 1 0 0	DUNCAN 2 4 0 0
ABERDEEN 4 1 0 0	HENDRICK 2 4 0 0
ABERDEEN 4 1 0 0	BELL 2 4 0 0
ABERDEEN 4 1 0 0	CARDENAS 2 4 0 0
ABERDEEN 4 1 0 0	WILLIAMS 2 4 0 0
ABERDEEN 4 1 0 0	DUFFY 2 4 0 0
ABERDEEN 4 1 0 0	PERRY 2 4 0 0
ABERDEEN 4 1 0 0	JACKSON 2 4 0 0
ABERDEEN 4 1 0 0	PARSON 2 4 0 0
ABERDEEN 4 1 0 0	MILLER 2 4 0 0

Total 30 11 11 Total 24 4 4 4
 Oakland 2 0 0 0 0 0 0 0 11
 Cleveland 0 0 0 0 0 0 0 0 4
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

IP H R ER BB SO
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

89ers 6, Royals 3

OMAHA	OKLA. CITY
ABERDEEN 4 1 0 0	FLINCH 2 4 1 2
ABERDEEN 4 1 0 0	HERMAN 2 4 1 2
ABERDEEN 4 1 0 0	BLANCH 2 4 0 1
ABERDEEN 4 1 0 0	FRANK 2 4 1 1
ABERDEEN 4 1 0 0	CANILL 2 4 0 1
ABERDEEN 4 1 0 0	FOLEY 2 4 1 1
ABERDEEN 4 1 0 0	INDIE 2 4 0 0
ABERDEEN 4 1 0 0	STANLEY 2 4 1 1
ABERDEEN 4 1 0 0	SMITH 2 4 1 1
ABERDEEN 4 1 0 0	PALMER 2 4 0 0
ABERDEEN 4 1 0 0	

Total 20 7 6 2 Total 17 6 10 6
 Omaha 0 0 0 0 0 0 0 0 3
 Oklahoma City 0 0 0 0 0 0 0 0 4
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

IP H R ER BB SO
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

Indy 8, Aeros 6

WICHITA	INDIANAPOLIS
ABERDEEN 4 1 0 0	ARMSTRONG 2 4 1 2
ABERDEEN 4 1 0 0	SPEC 2 4 1 2
ABERDEEN 4 1 0 0	GRILLY 2 4 1 2
ABERDEEN 4 1 0 0	DRAN 2 4 1 2
ABERDEEN 4 1 0 0	KOSCO 2 4 0 1
ABERDEEN 4 1 0 0	SCHMIDT 2 4 0 1
ABERDEEN 4 1 0 0	KING 2 4 0 1
ABERDEEN 4 1 0 0	POUL 2 4 0 1
ABERDEEN 4 1 0 0	OSCEOLA 2 4 0 1
ABERDEEN 4 1 0 0	YOUNG 2 4 1 1
ABERDEEN 4 1 0 0	ANDERSON 2 4 0 0
ABERDEEN 4 1 0 0	OSBORN 2 4 0 0

Total 29 6 4 3 Total 15 8 14 6
 Wichita 0 0 0 0 0 0 0 0 4
 Indianapolis 0 0 0 0 0 0 0 0 4
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

IP H R ER BB SO
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

Chisox 5, Yanks 0

NEW YORK	CHICAGO
ABERDEEN 4 0 0 0	PKELLY 2 4 0 0
ABERDEEN 4 0 0 0	CAMP 2 4 0 0
ABERDEEN 4 0 0 0	DALLEN 2 4 0 0
ABERDEEN 4 0 0 0	MURPHY 2 4 0 0
ABERDEEN 4 0 0 0	MILLER 2 4 0 0
ABERDEEN 4 0 0 0	MENDON 2 4 0 0
ABERDEEN 4 0 0 0	ANDREWS 2 4 0 0
ABERDEEN 4 0 0 0	HERMAN 2 4 0 0
ABERDEEN 4 0 0 0	LEON 2 4 0 0
ABERDEEN 4 0 0 0	RAHMAN 2 4 0 0
ABERDEEN 4 0 0 0	FORSTER 2 4 0 0

Total 20 0 0 0 Total 22 5 10 4
 New York 0 0 0 0 0 0 0 0 0
 Chicago 0 0 0 0 0 0 0 0 4
 1P Miller 2 0 1 1
 2P Miller 2 0 1 1
 3P Miller 2 0 1 1
 4P Miller 2 0 1 1
 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

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 1P Miller 2 0 1 1
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 5P Miller 2 0 1 1
 6P Miller 2 0 1 1
 7P Miller 2 0 1 1
 8P Miller 2 0 1 1
 9P Miller 2 0 1 1

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American League

INDIVIDUAL RATTING

[illegible]

Callahan NY	31	0	9	0	9	101
Carmona Fla	23	4	31	0	9	114
Cheney NC	34	4	4	0	7	114
Chaville Tex	31	9	9	0	12	9
Chathamway Cal	49	4	6	1	2	150
Columbia Fla	1	7	11	1	4	167
Cottonwood Ariz	19	5	4	0	9	101
Covington Ariz	14	7	5	1	9	101
Dee a Det	14	9	9	0	0	9

PITCHING.

	SP	HR	HR	W	L	RA
And. Chi	41	66	15	24	4	2.15
Castro Del	31	19	0	18	3	1.34
Flint Oak	17	31	0	17	1	1.4
St.nelly Del	52	34	19	17	4	1.7
Hillman Del	31	56	17	34	2	1.66
Steger Del	41	31	19	26	4	1.71
Johnson Mill	24	17	13	4	1	1.13
LeRoy Del	41	37	7	34	3	1.38
Castro KC	31	26	9	11	1	1.99
Johnson Del	47	45	0	18	1	2.06
N Ryan Del	31	45	26	41	4	1.32
LeRoy Del	51	66	14	44	3	2.64
Johnson Mill	39	37	17	4	1	2.47
Parson Mill	19	0	17	1	1	2.77
And. Del	5	4	4	2	2	2.77
Millersville NY	47	66	14	27	1	4.76
Paul Tex	24	24	4	13	3	1.64
St. Orleans NY	17	24	0	13	3	1.64
Johnson Mill	13	10	1	7	2	1.67
Millville KC	41	45	15	14	1	1.67
Johnson Mill	44	51	12	34	2	1.66
Palmer Del	31	34	11	21	1	2.21
Rehman Chi	31	42	21	11	4	1.73
LeRoy Del	36	46	12	33	1	3.18
King NY	37	20	12	5	2	1.18
East Bos	47	34	14	31	3	2.16
Roll Mill	37	31	27	15	3	2.92
Johnson Mill	22	24	11	14	1	2.66
Johnson Tex	37	37	17	14	2	3.69
Medich NY	31	29	3	21	2	1.69
Winds Min	32	31	4	17	2	3.94
LeRoy Del	20	13	0	0	3	3.98
Miller Oak	46	42	13	23	2	4.10
Johnson KC	37	33	19	13	2	4.34
Wright Cal	31	36	4	9	4	4.35
Widow Cle	17	31	14	19	3	4.40
Fryman Del	21	20	7	16	2	1.44
Kent Min	31	44	4	23	4	1.70
Busby KC	31	27	17	29	3	4.75
Weller Del	44	41	13	20	1	4.67
St. Fisher Chi	17	21	7	0	2	3.76
Johnson Del	14	19	10	0	3	4.19
Johnson Oak	31	29	21	16	5	4.21
Johnson Tex	24	23	13	0	2	4.93
McGlothlin Bos	16	24	7	9	1	4.44
Roll Mill	29	46	16	31	1	9.00
Drake KC	18	36	14	10	1	9.16

National League

INDIVIDUAL BATTING

	AR	R	H	HP	RBI	P
Wander All	30	4	12	0	4	40
Mordina SF	79	12	14	1	9	40
Early All	56	11	19	4	9	40
Antia LA	41	5	14	0	1	40
Antia PH	85	14	31	4	11	40
McQuillan Pch	94	15	30	1	4	40
McQuillan Pch	44	19	22	7	14	40
McQuillan Pch	94	12	31	6	21	40
McQuillan Pch	74	4	11	4	4	40
McQuillan Pch	81	29	29	2	14	40
McQuillan Pch	71	12	24	3	14	40
McQuillan Pch	40	12	26	1	4	40
McQuillan Pch	33	4	11	2	4	40
McQuillan Pch	14	6	18	8	9	40
McQuillan Pch	51	11	17	5	13	40
McQuillan Pch	47	2	14	0	4	40
McQuillan Pch	74	8	24	1	11	40
McQuillan Pch	79	15	25	4	21	40
McQuillan Pch	54	3	12	0	1	40
McQuillan Pch	76	8	22	1	13	40
McQuillan Pch	32	3	10	0	2	40
McQuillan Pch	81	18	27	4	17	40
McQuillan Pch	120	14	37	1	17	40
McQuillan Pch	78	9	24	2	10	40
McQuillan Pch	71	22	21	3	9	40
McQuillan Pch	105	15	32	3	16	40
McQuillan Pch	89	14	22	5	14	40
McQuillan Pch	64	8	20	0	1	40
McQuillan Pch	74	14	21	5	10	40
McQuillan Pch	43	5	13	0	2	40
McQuillan Pch	71	12	27	3	10	40
McQuillan Pch	90	15	27	1	10	40
McQuillan Pch	77	8	23	1	11	40
McQuillan Pch	95	9	28	1	9	40
McQuillan Pch	123	24	34	5	18	40
McQuillan Pch	44	13	25	2	7	40
McQuillan Pch	64	11	25	3	11	40
McQuillan Pch	69	13	20	3	10	40
McQuillan Pch	73	12	21	2	10	40
McQuillan Pch	54	11	16	1	7	40
McQuillan Pch	47	4	12	0	7	40
McQuillan Pch	40	3	12	0	8	40
McQuillan Pch	46	6	13	0	4	40
McQuillan Pch	46	5	11	2	7	40
McQuillan Pch	78	5	22	0	9	40
McQuillan Pch	57	9	16	1	7	40
McQuillan Pch	90	9	25	2	14	40
McQuillan Pch	76	5	21	0	8	40
McQuillan Pch	79	5	4	0	4	40
McQuillan Pch	98	10	27	1	12	40
McQuillan Pch	64	5	18	0	2	40
McQuillan Pch	76	11	20	2	12	40
McQuillan Pch	89	7	24	2	4	40
McQuillan Pch	90	8	24	0	4	40
McQuillan Pch	73	10	20	6	15	40
McQuillan Pch	109	14	29	6	18	40
McQuillan Pch	113	14	30	4	15	40
McQuillan Pch	87	7	23	2	4	40
McQuillan Pch	45	11	25	1	10	40
McQuillan Pch	47	8	11	0	7	40
McQuillan Pch	77	5	20	1	10	40
McQuillan Pch	113	13	24	1	10	40
McQuillan Pch	99	13	29	2	6	40
McQuillan Pch	39	3	10	0	3	40
McQuillan Pch	47	7	12	0	3	40
McQuillan Pch	107	24	27	0	17	40
McQuillan Pch	54	2	9	0	3	40
McQuillan Pch	84	13	22	7	19	40
McQuillan Pch	104	9	24	0	3	40
McQuillan Pch	37	4	9	2	6	40
McQuillan Pch	83	9	20	0	5	40
McQuillan Pch	50	7	12	2	8	40
McQuillan Pch	67	7	14	7	10	40
McQuillan Pch	40	4	14	1	8	40
McQuillan Pch	76	1	6	0	2	40
McQuillan Pch	26	3	6	0	2	40
McQuillan Pch	83	10	16	3	9	40
McQuillan Pch	104	9	24	0	9	40
McQuillan Pch	40	1	9	1	3	40
McQuillan Pch	90	5	18	0	7	40
McQuillan Pch	54	5	12	3	11	40
McQuillan Pch	72	10	14	1	4	40
McQuillan Pch	41	0	9	0	1	40
McQuillan Pch	94	11	21	5	16	40
McQuillan Pch	78	6	12	0	3	40
McQuillan Pch	69	6	15	1	9	40
McQuillan Pch	40	4	13	0	3	40
McQuillan Pch	37	4	8	0	3	40
McQuillan Pch	33	2	7	0	3	40
McQuillan Pch	71	5	15	0	1	40
McQuillan Pch	81	4	17	1	12	40
McQuillan Pch	81	18	17	4	12	40
McQuillan Pch	34	10	18	1	8	40
McQuillan Pch	67	5	14	0	3	40
McQuillan Pch	49	5	11	0	4	40
McQuillan Pch	29	5	6	1	4	40
McQuillan Pch	86	10	18	2	10	40
McQuillan Pch	92	12	19	0	6	40
McQuillan Pch	74	4	15	0	1	40
McQuillan Pch	40	7	8	0	9	40
McQuillan Pch	78	7	15	1	7	40
McQuillan Pch	97	9	18	0	1	40
McQuillan Pch	46	4	9	2	7	40
McQuillan Pch	26	1	7	0	3	40
McQuillan Pch	104	6	20	0	7	40
McQuillan Pch	38	5	11	0	4	40
McQuillan Pch	60	4	11	1	4	40
McQuillan Pch	67	12	12	7	11	40
McQuillan Pch	49	3	12	0	1	40
McQuillan Pch	82	9	14	3	8	40
McQuillan Pch	47	7	8	2	4	40
McQuillan Pch	34	3	6	1	5	40
McQuillan Pch	37	1	6	0	2	40
McQuillan Pch	31	1	5	1	2	40
McQuillan Pch	83	7	10	0	2	40
McQuillan Pch	30	7	9	1	6	40
McQuillan Pch	74	3	4	0	0	40
McQuillan Pch	54	2	8	0	2	40
McQuillan Pch	29	4	4	0	2	40
McQuillan Pch	25	3	3	0	1	40
McQuillan Pch	44	2	8	0	1	40
McQuillan Pch	64	2	8	1	1	40
McQuillan Pch	79	2	4	0	1	40

PITCHING

1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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9	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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14	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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17	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63																																					

*NOTE: These statistics are usually in the Sunday paper.

TEAM	GAMES WON	TOTAL	PERCENT

PLAYER	AT BATS	HITS	PERCENT

PITCHER	INNINGS PITCHED	ERA	RUNS GIVEN UP EACH GAME

PITCHER	INNINGS PITCHED	ERA	RUNS GIVEN UP EACH GAME

Use the Official Baseball Rules to draw a diagram of home plate. If the two sides coinciding with the foul lines are 12' long, use the Pythagorean Theorem to find the width. (i.e. width of the strike zone.)

Why is it easier for a left-handed batter to get to first base than a right-handed batter?

Using the Pythagorean Theorem, calculate the distance between first base and the third base.

Make a scale drawing of a playing field. .Indicate the scale used and label the distances.

What is the diameter of the largest baseball allowed for official play?

What is the strike zone? Is it a linear distance, an area, or a volume? Prove your answer and complete the appropriate measure of the strike zone using 33" as the distance from armpit to the top of the kneecap.

What is the height of your strike zone? Find out that information for all others in class of your sex and find the average. How does your strike zone height compare to the average?

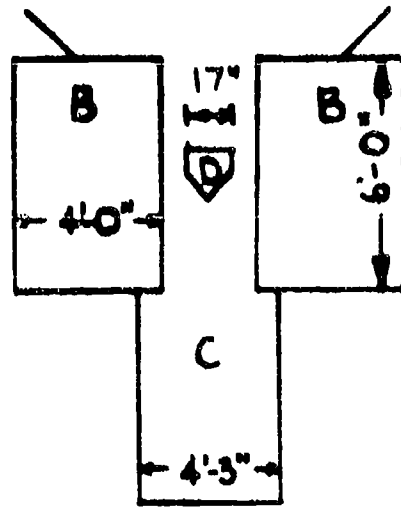
If you agree to use 33" as the height of the strike zone, what area does the pitcher have to throw a strike? (Be careful! Trick question!)

Draw the area of the strike zone using 33" as the height on a large piece of paper. Attach the paper to a wall or backstop outside so the bottom of the strike zone corresponds to the top of your knees. Stand back 60'6" and attempt to throw strikes, throwing exactly 6 times. (You may have 3 warmup pitches.) All of the class or just part may participate. Complete page 5A.



What is the area of the infield? (See 6A) What is the area in square yards?

What is the area of the pitcher's circle? What is the area of the batter's box?



B - BATTER'S BOX
C - CATCHER'S BOX
D - HOME PLATE

DIAGRAM A

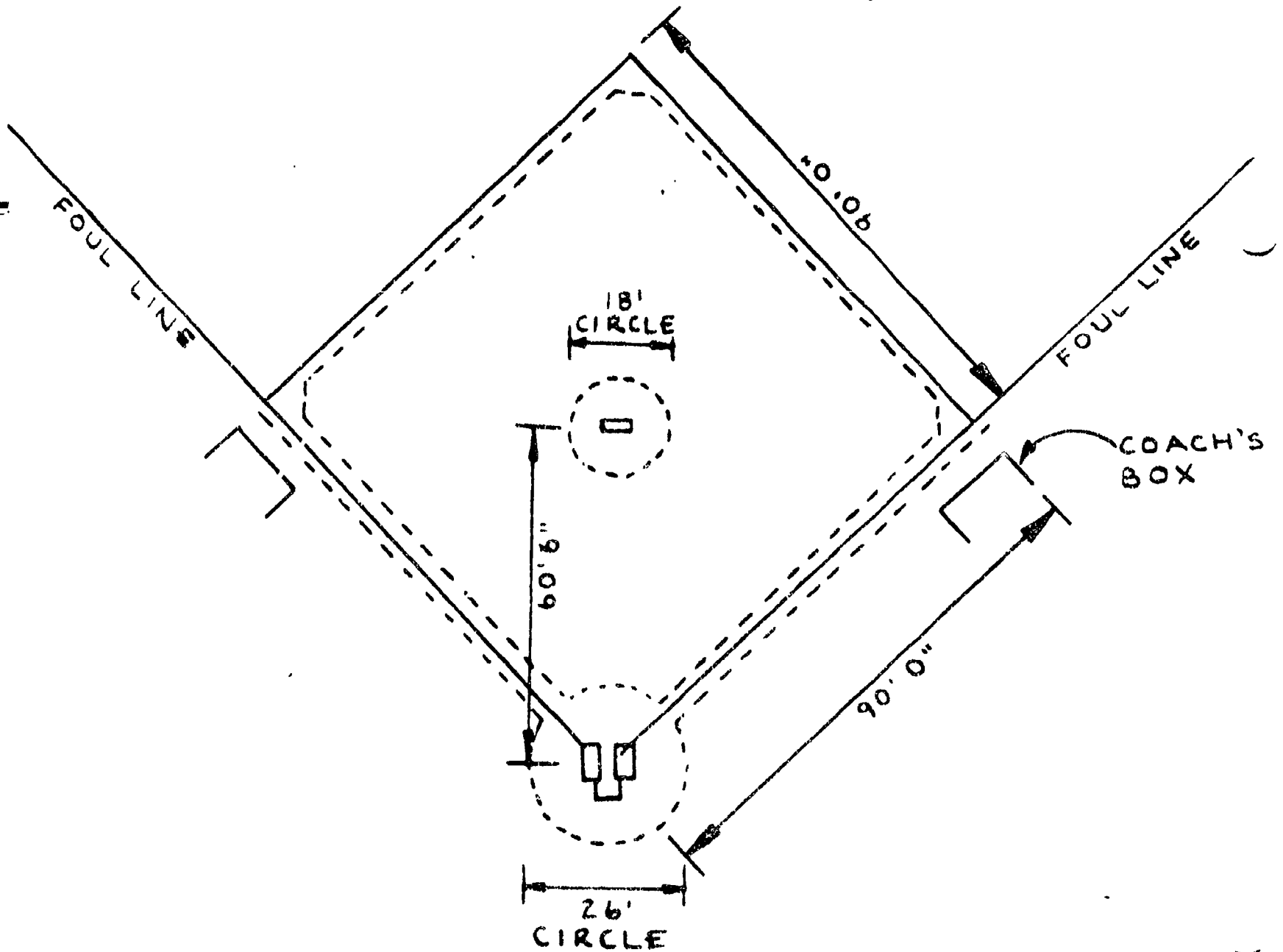


DIAGRAM B

Examine pages 7A, 7B, 7C, 7D and 7E.

Use 7F for collecting the information.

Which ball park(s) schedule(s) all its games during the day?
Which ball park has the greatest capacity? the least capacity?

The shortest distance a ball could travel for a home run would be the hypotenuse of the right triangle determined by the distance to the fence and the height of the wall i.e.



What is the minimum distance for a home run in left field at Yankee Stadium? at Fenway Park?

Choose two ball parks and compare the minimum distances for home runs hit to left field with those hit to right field.

Record your findings.

If you were a right hand power hitter, in what park would you like to play in? What if you were a left handed hitter?

CLUB DIRECTORIES, PARK DATA, GAME TIMES, TIME ZONES

7A

ATLANTA Braves

Atlanta Braves, Inc.
Office: Atlanta Stadium
Atlanta, Georgia 30312
Telephone (A.C. 404):
622-7639
Teletype 810-781-8212

GAMES AT: Atlanta Stadium
Capacity: 32,744

Playing field distances:

Left field fence..... 330 feet
Center field fence..... 400 feet
Right field fence..... 330 feet
Plate to grandstand..... 60 feet

Height of walls:

Left field..... 6 feet
Right field..... 6 feet

Game times:

Day games..... 1:15 p.m.
Day doubleheaders..... 1:15 p.m.
Twilight doubleheaders..... 6:05 p.m.
Night games..... 8:05 p.m.
Saturday night games 7:05 p.m.

(Eastern Daylight Time
April 29 to end of season)

CHICAGO Cubs

Chicago National League Ball
Park

Office: Wrigley Field, Clark and
Addison Streets
Chicago, Illinois 60613

Telephone:
Administrative Offices:
(312) 241-5050
Information & Services:
(312) 327-1919
Teletype: 910-221-5703

GAMES AT: Wrigley Field, Clark
and Addison Streets
Capacity: 37,741

Playing field distances:

Left field fence..... 355 feet
Center field fence..... 400 feet
Right field fence..... 353 feet
Plate to grandstand..... 60.5 feet

Height of walls:

Left and right field..... 11½ feet

Game times:

Single—
Mon. thru Fri. 1:30 p.m.
Single—Sat. & Sun. 1:15 p.m.
All doubleheaders .. 12:30 p.m.

(Central Daylight Time
April 29 to end of season)

CINCINNATI Reds

The Cincinnati Reds, Inc.

Office: 100 Riverfront Stadium
Cincinnati, Ohio 45202
Telephone (A.C. 513):
421-4510

GAMES AT: Riverfront Stadium
Capacity: 51,726

Playing field distances:

Left field fence..... 330 feet
Center field fence..... 404 feet
Right field fence..... 330 feet
Plate to grandstand..... 51 feet

Height of walls:

Outfield fence..... 12 feet

Game times:

Opening game..... 2:30 p.m.
Weekday nights..... 8:05 p.m.
Saturday nights..... 7:00 p.m.
Sat., Sun. & afternoon
single games..... 2:15 p.m.
Sun. doubleheaders 1:15 p.m.
Twilight
doubleheaders..... 5:30 p.m.
April 25, May 17..... 12:30 p.m.
May 28..... 12 noon
July 4..... 11:00 a.m.
July 27..... 3:00 p.m.
Sept. 18..... 5:00 p.m.

(Eastern Daylight Time
April 29 to end of season)

HOUSTON Astros

The Houston Sports Association

Office: Astrodome
P. O. Box 288
Houston, Texas 77001

Telephone (A.C. 713):
Riverside 8-4500
Teletype: 910-881-1740

GAMES AT: The Astrodome
Houston, Texas
Capacity: 45,000

Playing field distances:

Left field..... 330 feet
Center field..... 400 feet
Right field..... 330 feet
Plate to grandstand..... 60 feet

Height of walls:

All..... 12 feet

Game times:

All night games..... 7:30 p.m.
Saturday day games..... 1:15 p.m.
Sunday day games..... 2:00 p.m.
Twilight
doubleheaders..... 5:30 p.m.

(Central Daylight Time
April 29 to end of season)

LOS ANGELES Dodgers

Los Angeles Dodgers, Inc.

Office: Dodger Stadium
1000 Elysian Park Ave.
Los Angeles, California
90012

Telephone (A.C. 213):
225-1411
Teletype: 910-321-5773

GAMES AT: Dodger Stadium
1000 Elysian Park
Ave.
Capacity: 38,000

Playing field distances:

Left field..... 330 feet
Center field fence..... 395 feet
Right field..... 330 feet
Plate to grandstand..... 75 feet

Height of walls:

Outfield fence..... 8 feet

Game times:

Night games (Mon.-Fri.) 8 p.m.
Night games (Saturdays) 7 p.m.
Twilight doubleheaders 5 p.m.
Saturday day games..... 1 p.m.
Sunday games..... 2 p.m.

(Pacific Daylight Time
April 29 to end of season)

MONTREAL Expos

Montreal Baseball Club Ltd.

Address: P.O. Box 500
Station R
Montreal 326,
Quebec, Canada
Telephone (A.C. 514):
373-0433
Teletype: 610-421-3733

GAMES AT: Jarry Park
St. Laurent Blvd.
and Jarry St.
Capacity: 28,000

Playing field distances:
Left field fence..... 340 feet
Center field fence..... 417 feet
Right field fence..... 340 feet
Plate to grandstand..... 60 feet

Height of wire fences: all 5 feet

Game times:

Day games..... 2:15 p.m.
Day doubleheaders..... 1:35 p.m.
Twilight
doubleheaders..... 6:05 p.m.
Night games..... 6:05 p.m.
Twilight games.
May 4, 7, 8,
17 & 18..... 6:00 p.m.
Twilight games.
May 26 & Sept. 18 5:00 p.m.

(Eastern Daylight Time
April 29 to end of season)

NEW YORK Mets

Metropolitan Baseball Club, Inc.

Office: Shea Stadium
126th St. & Roosevelt Ave.
Flushing, N. Y. 11368
Telephone (A.C. 212):
672-7000
Bus. off. 672-7000
Ticket-game info.:
672-3000
Teletype 710-542-1496

GAMES AT: Shea Stadium
As above
Capacity: 35,300

Playing field distances:

Left field..... 341 feet
Center field..... 410 feet
Right field..... 341 feet
Plate to grandstand..... 60 feet

Height of walls:

All..... 8 feet

Game times:

Single day games
(Sun.-Fri.)..... 2:05 p.m.
Single day games
(Sat.)..... 2:15 p.m.
Day doubleheaders..... 1:05 p.m.
Night games..... 8:05 p.m.
Twilight
Doubleheaders..... 6:35 p.m.
Sept. 21..... 7:05 p.m.

PHILADELPHIA Phillies

Philadelphia
National League Club

Office: Veterans Stadium, Broad
Street and Pattison Ave.
Philadelphia, Pa. 19148

Telephone (A.C. 215):
HO 3-6000

GAMES AT: As above
Capacity: 36,730

Playing field distances:

Left field..... 330 feet
Center field..... 408 feet
Right field..... 370 feet
Plate to grandstand..... 60 feet

Height of walls:

All..... 12 feet

Game times:

Night games..... 7:35 p.m.
Single day games..... 1:35 p.m.
Day doubleheaders..... 1:05 p.m.
Twilight
doubleheaders..... 6:35 p.m.

PITTSBURGH Pirates

Pittsburgh Athletic Co., Inc.

Office: Three Rivers Stadium
600 Stadium Circle,
Pittsburgh, Pa. 15212
Telephone (A.C. 412):
323-1000

GAMES AT: As above
Capacity: 50,230

Playing field distances:

Left field..... 340 feet
Center field..... 410 feet
Right field..... 340 feet
Plate to grandstand..... 60 feet

Height of walls:

All..... 10 feet

Game times:

Night games..... 8:05 p.m.
Saturday night games 7:05 p.m.
Twilight
doubleheaders..... 6:05 p.m.
Doubleheaders..... 1:00 p.m.
Sept. 3 doubleheader 10:35 a.m.
Opening day and Sunday
single games..... 1:35 p.m.
Saturday afternoon
games..... 2:15 p.m.
May 28..... 11:05 a.m.

ST. LOUIS Cardinals

St. Louis National Baseball Club,
Inc.

Office: Busch Memorial Stadium
250 Stadium Plaza
St. Louis, Mo. 63102
Telephone (A.C. 314):
GA. 1-3060
Teletype: 910-761-0563

GAMES AT: Busch Memorial
Stadium
Capacity: 50,101

Playing field distances:

Left field fence..... 330 feet
Center field fence..... 414 feet
Right field fence..... 330 feet
Plate to grandstand..... 64 feet

Height of walls:

All: 10 feet, 6 inches

Game times:

Day (Mon. thru Fri.) 12:30 p.m.
Sat. and Holiday
single..... 1:15 p.m.
Day doubleheaders..... 1:15 p.m.
Twilight
doubleheaders..... 6:30 p.m.
Night games
(Mon.-Fri.)..... 8:00 p.m.
Night games (Mon.-Fri.)
April 12 through May 11
and month of Sept. 7:30 p.m.
Saturday night..... 7:00 p.m.
Sunday single..... 1:15 p.m.
May 18, June 18, July 2,
July 16, August 13 2:15 p.m.

SAN DIEGO Padres

San Diego Padres

Office: San Diego Stadium
9449 Friars Road
San Diego, California
92120

Telephone: All (A.C. 714):
283-4494

GAMES AT: San Diego Stadium,
as above
Capacity: 44,790

Playing field distances:

Left field fence..... 330 feet
Center field fence..... 410 feet
Right field fence..... 330 feet
Height of walls..... 17 feet

Game times:

Day games..... 1:00 p.m.
Night games..... 7:30 p.m.
Sunday doubleheaders 1:00 p.m.
Twilight
doubleheaders..... 6:00 p.m.
April 14, May 26, June 23,
July 27..... 6:00 p.m.

SAN FRANCISCO Giants

San Francisco Giants Baseball
Club

Office: Candlestick Park
San Francisco, Calif.
94124

Telephone (A.C. 415):
467-8000

Teletype: 415-393-9039

GAMES AT: Candlestick Park
Bay Shore
Capacity: 38,000

Playing field distances:
Left field..... 335 feet
Center field..... 410 feet
Right field..... 335 feet

Height of walls:

All fields..... 3 feet

Game times:

Single day games..... 12:15 p.m.
Sunday doubleheaders 12:15 p.m.
Night games..... 8:00 p.m.
Twilight
doubleheaders..... 5:30 p.m.

CLUB AND PARK DATA

DETROIT TIGERS TIGER STADIUM

Seating Capacity: 54,220

Playing field distances:

Left field	340
Left center	365
Center field	440
Right center	370
Right field	325
Height of wall	9 ft.



TIGER STADIUM

Detroit Baseball Club

Tiger Stadium
Michigan & Trumbull Avenues
Detroit, Mich. 48216

Telephone: 313-962-4000

Teletype: 810-221-9422

Game Times:

Day games (except Saturdays)	1:30 P.M.
Saturday day games	2:15 P.M.
Doubleheaders	1:30 P.M.
Night games (except Monday night games)	8:00 P.M.
Monday night games	8:15 P.M.
Twilight	5:30 P.M.

(Eastern Daylight Time April 29 to end of season).

Admission Prices:

Boxes	\$4.00
Res. Grand Stand	3.00
General Admission	2.00
Bleachers	1.00

MILWAUKEE BREWERS COUNTY STADIUM

Seating Capacity: 46,000

Playing field distances:

Left field line	320
Left field	362
Left center	392
Center field	402
Right center	392
Right field	362
Right field line	315

Height of fences:

Left field	8 ft.
Right field	10 ft.



COUNTY STADIUM

Milwaukee Brewers Baseball Club, Inc.

County Stadium
Milwaukee, Wisconsin 53246

Telephone: 414-933-8650

Teletype: 910-262-3320

Game Times:

Day Games	1:30 P.M.
Night Games	7:30 P.M.
Doubleheaders	1:00 P.M.
Twilight	6:00 P.M.

(Central Daylight Time April 29 to end of season).

Admission Prices:

Mezzanine	\$5.25
Box Seats	4.25
Lower Grand Stand	3.25
Upper Grand Stand	2.25
General Admission	2.25
Bleachers	1.25

NEW YORK YANKEES YANKEE STADIUM

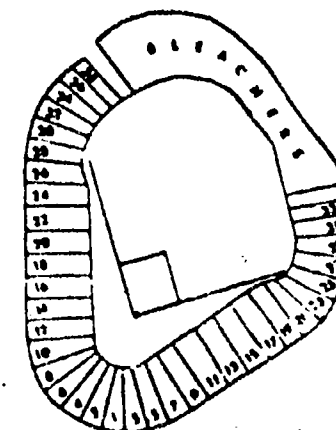
Seating Capacity: 65,010

Playing field distances:

Left field line	301
Left field	402
Left center	457
Center field	461
Right center	407
Right field	344
Right field line	296

Height of walls:

R.F. foul line	43'-45"
Right center	7'-10"-14'-6"
Center	22'-5"
Left center	7'-10"-13'-10"
Left field	51'-43"



YANKEE STADIUM

New York Yankees, Inc.

Yankee Stadium
E. 161 St. & River Avenue
Bronx, N. Y. 10451

Telephone: 212-293-6000

Teletype: 710-593-2107

Game Times:

Single Day games	2:00 P.M.
Doubleheaders	1:00 P.M.
Night games	7:30 P.M.
Twilight	5:00 P.M.
Twilight games	6:00 P.M.

(Eastern Daylight Time April 29 to end of season).

Admission Prices:

Boxes	\$4.00
Res. Grand Stand	3.00
General Admission	1.50
Bleachers	1.00

CLUB AND PARK DATA

CALIFORNIA ANGELS ANAHEIM STADIUM

Seating Capacity: 41,200

Playing field distances:

Left field 333
Left center 369
Center field 402
Right center 369
Right field 333

Height of wall 8 ft.



ANAHEIM STADIUM

Golden West Baseball Co.
Anaheim Stadium
2000 State College Blvd.
Anaheim, Calif. 92806

Telephone: 714-633-2000

Teletype: 910-594-1453

Game Times:

Day Games 2:00 P.M.
Twilight 4:00 P.M.
Night Games 8:00 P.M.
Saturday Night Games (except June 16) 7:00 P.M.
Sunday Doubleheader (June 17) 1:00 P.M.
(Central Daylight Time April 29 to end of season).

Admission Prices:

Club Boxes \$4.00
Box Seats 4.00
Reserved Seats 3.50
General Admission 1.00

CHICAGO WHITE SOX WHITE SOX PARK

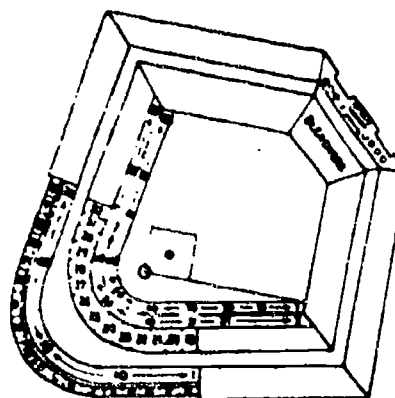
Seating Capacity: 46,550

Playing field distances:

Left field 352
Left center 375
Center field 400
Right center 375
Right field 352

Height of center field fence 5 ft.

Height of left field and right field walls 9 ft.



WHITE SOX PARK

Chicago White Sox
Division of Artnell Co.
Dan Ryan at 35th Street
Chicago, Ill. 60616

Telephone: 312-924-1000

Teletype: 910-221-5687

Game Times:

Day Games 1:15 P.M.
Night Games 8:00 P.M.
(Central Daylight Time April 29 to end of season).

Admission Prices:

Box Seats \$4.00
Res. Grand Stand 3.00
General Admission 1.75
In and under 1.00
Bleachers 1.00

KANSAS CITY ROYALS ROYALS STADIUM

Seating Capacity: 40,613

Playing field distances:

Left field 330
Left center 385
Center field 410
Right center 385
Right field 330

Height of wall 12 ft.



ROYALS STADIUM

Kansas City Royals Baseball Club

P. O. Box 1969
Kansas City, Missouri 64141

Telephone: 816-921-8000

Teletype: 910-771-2008

Game Times:

Day Games & Doubleheaders 1:30 P.M.
Night Games 7:30 P.M.
Twilight 6:00 P.M.
(Central Daylight Time April 29 to end of season).

Admission Prices:

Club Box Seat \$6.00
Box Seat 4.00
Reserved Grandstand 3.00
General Admission 1.50

CLUB AND PARK DATA

BALTIMORE ORIOLES MEMORIAL STADIUM

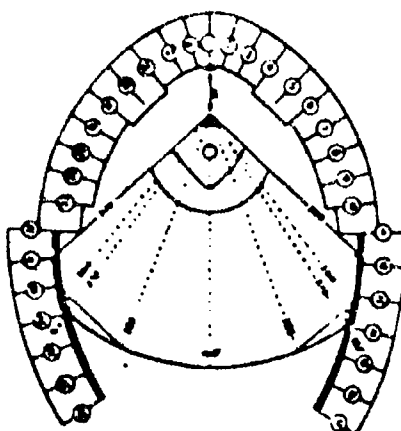
Seating Capacity: 52,137

Playing field distances:

Field	309
Left center	385
Center field	410
Right center	385
Right field	309

Height of walls:

From R.F. and L.F. to center field fence ..	14 ft.
Center field fence ...	7 ft.



MEMORIAL STADIUM

Baltimore Baseball Club, Inc.

Memorial Stadium
Baltimore, Md. 21218

Telephone: 301-243-9800
Teletype: 710-234-1616

Game Times:

Day Games* 2:15 P.M.

*Exception —

July 4 1:30 P.M.

Night Games 7:30 P.M.

Twilight/Night Doubleheaders and Sunday

Single Twilight Games 5:30 P.M.
(Eastern Daylight Time April 29 to end of season).

Admission Prices:

Box seats	\$4.00
Res. Grand Stand (Preferred)	3.00
(Lower)	2.50
(Upper)	2.00
General Admission	1.50
(Under 12)85
Bleachers85
(Under 12)55

BOSTON RED SOX FENWAY PARK

Seating Capacity: 33,379

Playing field distances:

Left field	315
Center field	390
C.F. corner	420
Deep R.F.	380
Right field	302

Height of walls:

Left field	37 ft.
(screen extends 23 ft.)	
C.F. wall	17 ft.
Bullpens	5 ft.
R.F. fence	3-5 ft.



FENWAY PARK

Boston Red Sox

Fenway Park
24 Jersey Street
Boston, Mass. 02215

Telephone: 617-267-9440

Teletype: 710-321-6856

Game Times:

Day games (MON.-FRI.)* 1:30 P.M.

*Exceptions —

April 16 11:00 A.M.

September 3 11:00 A.M.

Saturday and Sunday day games 2:00 P.M.

Day Doubleheaders 1:30 P.M.

Night games 7:30 P.M.

Twilight 5:30 P.M.

(Eastern Daylight Time April 29 to end of season).

Admission Prices:

Roof Box	\$5.00
Boxes	4.00
Res. Grand Stand	3.00
General Admission	1.50
Bleachers	1.00

CLEVELAND INDIANS MUNICIPAL STADIUM

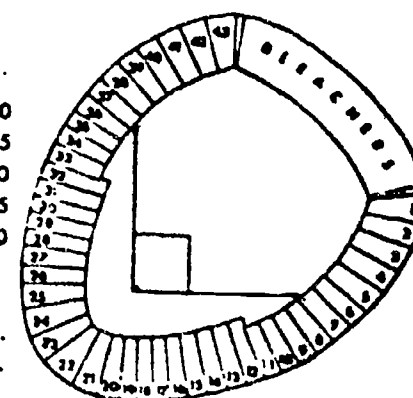
Seating Capacity: 76,997

Playing field distances:

Left field	320
Left center	385
Center field	400
Right center	385
Right field	320

Height of walls:

R.F. and L.F. stands ...	7 ft.
Center field	5 ft. 6 in.



MUNICIPAL STADIUM

Cleveland Indians

Municipal Stadium
Boudreau Boulevard
Cleveland, Ohio 44114

Telephone: 216-861-1200

Teletype: 810-421-8257

Game Times:

Day Games (Sunday doubleheaders and Wednesdays)* .. 1:00 P.M.

*Exceptions —

April 7 2:00 P.M.

April 8 2:00 P.M.

Sept. 5 6:00 P.M.

Monday, Tuesday, Thursday, and Saturday 6:00 P.M.

Friday nights 8:00 P.M.

(Eastern Daylight Time April 29 to end of season).

Admission Prices:

Boxes	\$4.00
Reserved Grand Stand	3.50
Mezzanine	2.50
Bleachers50

CLUB AND PARK DATA

MINNESOTA TWINS METROPOLITAN STADIUM

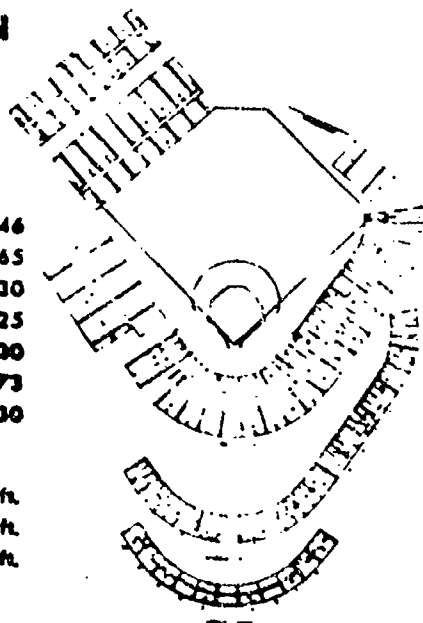
Seating Capacity: 45,921

Playing field distances:

Left field line	346
Left field	365
Left center	430
Center field	425
Right center	430
Right field	373
Right field line	330

Height of fences:

Left field	12 ft.
Center field	8 ft.
Right field	8 ft.



**METROPOLITAN
STADIUM**

Minnesota Twins, Inc.
Metropolitan Stadium
8001 Cedar Avenue
Bloomington, Minnesota 55420
Telephone: 612-834-4040
Teletype: 910-576-2854

Game Times:

Day Games	1:15 P.M.
May 28 (11:00 A.M.), Sept. 22 (10:30 A.M.)	
Sunday Single Games	2:00 P.M.
Doubleheaders	1:15 P.M.
Night Games	8:00 P.M.
Twilight	5:30 P.M.
(Central Daylight Time April 29 to end of season).	

Admission Prices:

Boxes	\$4.00
Res. Grand Stand	3.50
Grand Stand	1.50

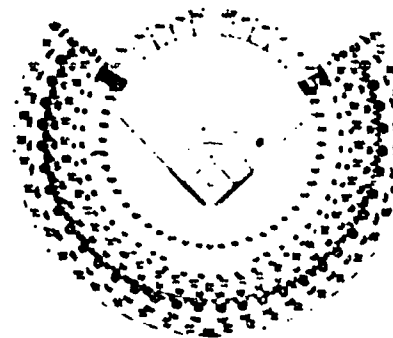
OAKLAND A's OAKLAND-ALAMEDA COUNTY COLISEUM

Seating Capacity: 50,000

Playing field distances:

Left field	330
Left center	375
Center field	400
Right center	375
Right field	330

Height of wall 8 ft.



OAKLAND COLISEUM

Oakland A's
Oakland Coliseum
Oakland, California 94621
Telephone: 415-635-4300
Teletype: 910-366-7394

Game Times:

Day Games	1:30 P.M.
Doubleheaders	1:30 P.M.
Night Games (Monday-Friday)	8:00 P.M.
Twilight	6:00 P.M.
(Pacific Daylight Time April 29 to end of season).	

Admission Prices:

Loge boxes	\$5.50
First deck	4.50
Second deck	3.50
Third deck	3.00
Bleachers	2.00

TEXAS RANGERS ARLINGTON STADIUM

Seating Capacity: 35,739

Playing field distances:

Foul lines	330
Right center	380
Left center	380
Center field	400

Height of fence 11 ft.



ARLINGTON STADIUM

Texas Rangers, Inc.
Arlington Stadium
P. O. Box 1111
1500 Copeland Road
Arlington, Texas 76010
Telephone: 817-265-9101
Teletype: 910-890-5120

Game Times:

Day games Sept. 2 vs. Minnesota	1:00 P.M.
July 27 vs. California and Sept. 21 vs. California	5:00 P.M.
Night games	7:30 P.M.
Twilight doubleheaders	6:00 P.M.
(Central Daylight Time April 29 to end of season).	

Admission Prices:

Field Boxes	\$4.50
Boxes	4.00
Res. Grand Stand	3.50
General Admission	2.00
Children's General Admission (13 & under)	1.00

Write a computer program that would analyze the data on 7A, 7B, and 7C, 7D and 7E.

For example, what is the maximum number of people that could be attending a baseball game on a given Sunday afternoon?

What is the average distance to the left field fence in the National League? the American League?

Select data that interests you and write a program that will help generalize.

Use 9A to answer the following:

The batter hits the ball to the points:
 $(4,3)$; $(-9,13)$; $(9,2)$; $(-6,-1)$; $(7,22)$.

Is the ball foul, fair, or home run?

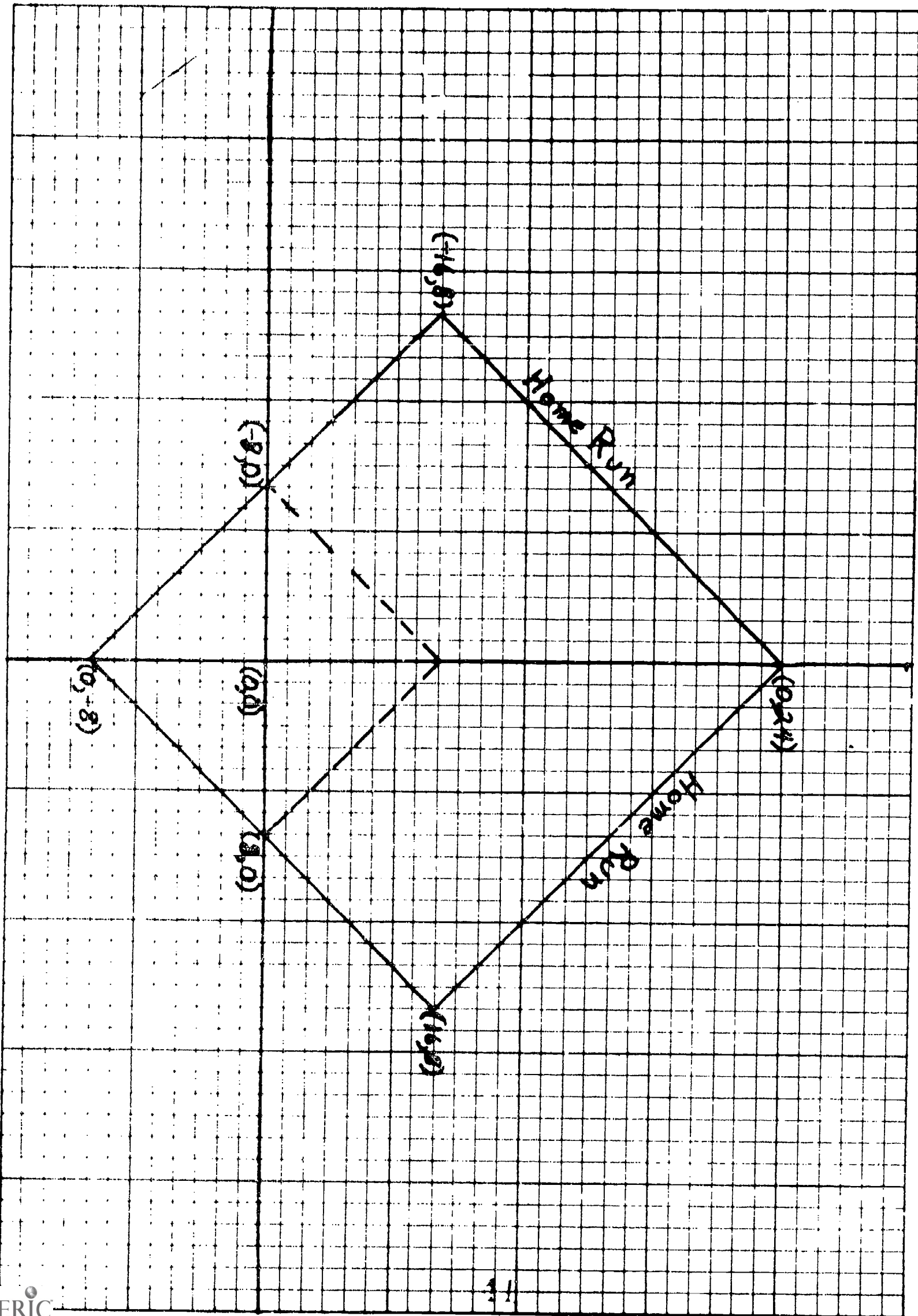
Is the ball in the infield or the outfield?

What do you notice about all of these hits?

The batter hits the ball to the points:
 $(-14,3)$, $(14,3)$; $(6,26)$, $(-6,26)$; $(2,7)$, $(-2,7)$; $(4,-8)$, $(-4,-8)$,
 $(-17,17)$, $(17,17)$;

Is the ball foul, fair, or home run?

Look at where the first and second hits landed. The third
 and fourth, etc. what do you notice?



Baseball Card Game

With the ball field diagram and cards, use the coordinate system (10B) and the following rules to play baseball (score sheets provided):
10A

Rules

1. Cards are shuffled and placed face down in the center.
2. First player turns the top card over and uses it with the diagram to determine if he got a single, double, out, etc.
3. Each player's turn is 1/2 inning and stops when he has made three outs. The game is ended after seven or nine full innings.
4. Base runners advance only the same number of bases as the hitter (i.e., a single moves all runners one base, double two bases, etc.).
5. Reshuffle after each full inning.

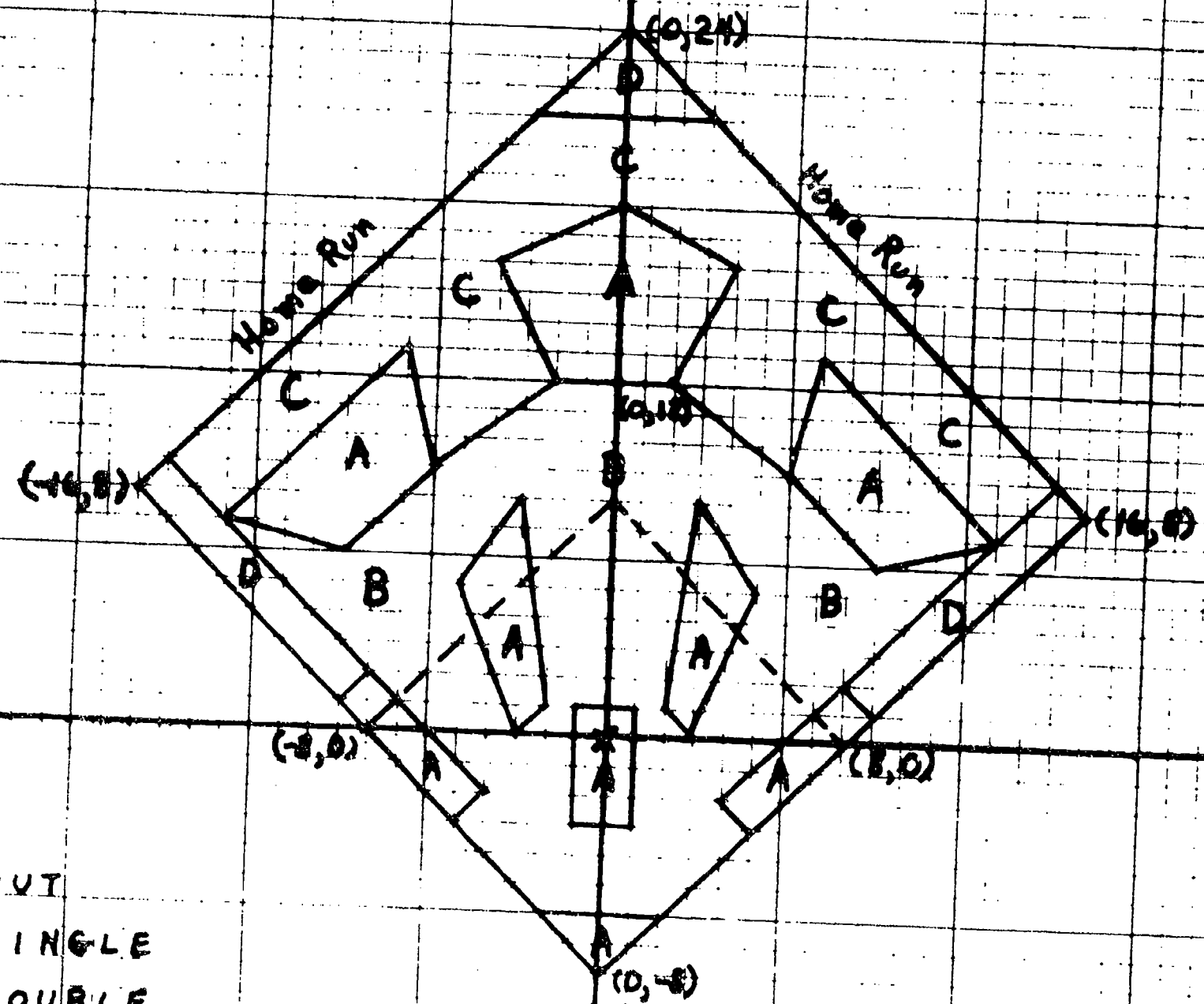
We suggest you use some kind of markers (four per team) to move as men on the bases (golf tees, pennies, whatever).

Baseball Card Game
Score Sheet

TEAM ONE			TEAM TWO		
Inning	Runs	Outs	Inning	Runs	Outs
Total			Total		

TEAM ONE			TEAM TWO		
Inning	Runs	Outs	Inning	Runs	Outs
Total			Total		

10 B



A = OUT
 B = SINGLE
 C = DOUBLE
 D = TRIPLE

NOTE: X MARK IS (0, 0)

Baseball Card Game

Materials needed:

1. Game board on 1/4" graph paper (page 10B is a sample).
2. Three markers for runners: golf tees, paper clips, etc.
3. Score sheet (page 10A is a sample).
4. 62 card deck as follows: (See sample cards below)
 - a. 13 "out" cards: (-3,6), (6,-1), (7,10), (3,1) (0,-2) (0,-7) (-8,1) (-7,11) (-9,8) (1,13) (-2,16) (-4,3) (12,7)
 - b. 13 "single" cards: (1,-5) (6,3) (0,6) (-10,5) (-4,10) (3,9) (11,6) (-2,7) (4,-1) (-7,7) (2,10) (-11,6) (-4,-1)
 - c. 5 "double" cards: (-4,12) (-14,9) (1,19) (13,9) (-2,20)
 - d. 4 "triple" cards: (-10,3) (-1,22) (-15,8) (-14,7)
 - e. 3 "home run" cards: (-14,11) (-3,22) (13,12)
 - f. 5 "strike out" cards
 - g. 3 "walk" cards
 - h. 3 "double play" cards. In center print, "Valid only if runner on first. Otherwise just batter is out."
 - i. 3 "runner steals second cards". In center print, "valid only if no runner on second".
 - j. 2 "passed ball" cards. In center print "Each runner advances one base."
 - k. 2 "wild pitch" cards. In center print, "each runner advances one base".
 - l. 2 "foul out" cards
 - m. 2 "tagged out stealing" cards. In center print, "Valid only if runner on first with second empty or runner on second with third empty".
 - n. 2 "long single" cards. In center print, "If runner on second, he scores".

Sample Cards

$(-7, 11)$

$(-7, 11)$

WALK

WALK

ERROR

EACH RUNNER
ADVANCES ONE
BASE

ERROR

Manufacture of a Baseball¹

Harassed pitchers may swear there's a live jackrabbit inside the ball, but according to A.G. Spalding Bros. Inc. - which manufactures all the official American and National League baseballs in its plant at Chicopee, Massachusetts - actually the core consists of a cork composition containing a small percentage of rubber. This core is $13/16$ of an inch in diameter.

Two black rubber shells² each approximately $5/32$ of an inch thick, are wrapped around the core, with a thin cushion of red rubber between the edges of the hemispherical black rubber shells. Next comes a red rubber wrapping $3/32$ of an inch thick. The entire "pill" is molded perfectly round to $4\ 1/8$ inches circumference.

Wool is wound around the pill under precise humidity and tension control in three operations: first application, 121 yards of four-ply gray woolen yarn, brings size to $7\ 3/4$ inches circumference; second winding, 45 yards of three-ply white woolen yarn, increases it to $8\ 3/16$ inches circumference; third winding, 53 yards of three-ply gray woolen yarn, makes size of ball coated with a layer of latex (rubber cement) to prevent unraveling. By now the overall circumference is $8\ 7/8$ inches.

The covers, of selected horsehide leather between .050-.055 of an inch thick, are cut on a machine into the pattern of "a swollen figure 8", with 108 stitch-holes bordering each cover. Two such pieces are used to cover a baseball. After dampening the horsehide to make it pliable, the covers are handstitched with red cotton thread. Any pinching that occurs when the cover shrinks back tight is eliminated by rolling the balls. By now the circumference is the regulation $9\ 1/4$ inches circumference and weighs between $5\ 1/4$ ounces.

All the balls head for either of two stamping machines. One, for American League baseball, stamps the "Reach" trademark plus the AL president's autograph on the cover. The other, for official NL balls, registers the "Spalding" symbol as well as the league president's signature. Aside from the printing on the cover, the balls of both leagues are absolutely identical.

¹ Reprinted from Turkin, Hy and Thompson, S.C. The Official Encyclopedia of Baseball. New York: Barnes, 1970, P. 645.

² These shells are hemispheres.

What is the difference in circumferences of the "core" and the "pill"?

What is the difference in diameters?

What is the difference in radii?

What is the difference between the circumference of the "pill" and the overall circumference including the second winding of yarn?

What are the differences in diameter between the "pill" and the first winding.

What are the differences in radii?

Which winding is the thickest?

Which winding is the thinnest?

Using the given measurements, show that the pill's circumference is $4\frac{1}{8}$ ".

Take a field trip to a baseball game. Before you do, decide what statistical data you will collect and what you will do with it.

Design a sheet to take with you to the game to record your data and list your computed statistics.